

CLAIMS

1. An imaging system comprising:
 - a light source to generate light for illuminating an object having features aligned in a first direction and features aligned in a second direction;
 - 5 a lens for imaging the illuminated object onto a surface;
 - a spatial selection device selective in a first mode of light corresponding to features of the illuminated object aligned in the first direction and selective in a second mode of light corresponding to features of the illuminated object aligned in the second direction;
 - a polarization device optically coupled to the spatial selection device and selective
10 in the first mode of s-polarized light corresponding to the first direction and selective in the second mode of s-polarized light corresponding to the second direction; and
 - a controller for selecting operation in the first mode or in the second mode.
2. An imaging system as defined in claim 1, wherein the spatial selection device
15 comprises a pupil filter and a rotation device for rotating the pupil filter with respect to an optical axis.
3. An imaging system as defined in claim 2, wherein the rotation device is configured for rotating the pupil filter between first and second positions in the first and second
20 modes, respectively.
4. An imaging system as defined in claim 3, wherein the pupil filter includes one or more blocking regions and one or more non-blocking regions.
- 25 5. An imaging system as defined in claim 4, wherein the blocking regions comprise wedge-shaped blocking regions.
6. An imaging system as defined in claim 5, wherein the wedge-shaped blocking regions have angles of about 90°.
- 30 7. An imaging system as defined in claim 5, wherein the wedge-shaped blocking regions have angles of greater than 90°.

8. An imaging system as defined in claim 4, wherein the blocking regions are bounded by an inner radius and an outer radius.
- 5 9. An imaging system as defined in claim 4, wherein the pupil filter further includes a region proximate the optical axis with partial transmission of light from the light source.
10. An imaging system as defined in claim 4, wherein the blocking regions and the non-blocking regions are separated by 90° .
- 10 11. An imaging system as defined in claim 4, wherein the spatial selection device comprises a shutter assembly configured to block light corresponding to features of the object aligned in the second direction in the first mode and configured to block light corresponding to features of the object aligned in the first direction in the second mode.
- 15 12. An imaging system as defined in claim 1, wherein the spatial selection device is positioned proximate a pupil of the lens.
13. An imaging system as defined in claim 5, wherein the light source is configured for
20 illuminating a lithography mask.
14. An imaging system as defined in claim 1, configured as a lithographic system.
15. An imaging system as defined in claim 1, wherein the polarization device
25 comprises a polarizer having an optical axis and a rotation device for rotating the polarizer about an optical axis.
16. An imaging system as defined in claim 15, wherein the rotation device is
30 configured for rotating the polarizer between first and second positions in the first and second modes, respectively.

17. An imaging system as defined in claim 15, wherein the polarizer is located between the light source and the object.

18. An imaging system as defined in claim 15, wherein the polarizer is located
5 between the object and the surface.

19. An imaging system as defined in claim 1, wherein the spatial selection device comprises a pupil filter having one or more blocking regions and one or more non-blocking regions, wherein the polarization device comprises a polarizer, said imaging
10 system further comprising a device for rotation of the pupil filter and the polarizer between respective first and second positions corresponding to the first and second modes, respectively.

20. An imaging system as defined in claim 19, wherein the first and second positions
15 are separated by 90°.

21. An imaging system as defined in claim 1, wherein the spatial selection device and the polarization device are configured for equal intensity illumination of the surface in the first and second modes.
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22. A method for projecting an image onto a surface, comprising:
generating light for illuminating an object having features aligned in a first direction and features aligned in a second direction;
in a first step, imaging onto the surface light corresponding to features of the
25 illuminated object aligned in the first direction, blocking light corresponding to features of the illuminated object aligned in the second direction, and polarizing light imaged onto the surface to select s-polarized light corresponding to the first direction; and
in a second step, imaging onto the surface light corresponding to features of the
illuminated object aligned in the second direction, blocking light corresponding to features
30 of the illuminated object aligned in the first direction, and polarizing light imaged onto the surface to select s-polarized light corresponding to the second direction.

23. A method as defined in claim 22, wherein blocking light is performed by a pupil filter having one or more blocking regions and one or more non-blocking regions.
24. A method as defined in claim 23, further comprising rotating the pupil filter from a first position to a second position between the first and second steps.
25. A method as defined in claim 22, wherein blocking light is performed by a shutter assembly.
26. A method as defined in claim 22, wherein illuminating an object comprises illuminating a lithography mask.
27. A method as defined in claim 22, configured for optical lithography.
28. A method as defined in claim 22, wherein polarizing light is performed by a polarizer.
29. A method as defined in claim 28, further comprising rotating the polarizer between first and second positions between the first and second steps.
30. A method as defined in claim 22, wherein blocking light is performed by a pupil filter having blocking regions and non-blocking regions, wherein polarizing light is performed by a polarizer, further comprising rotating the pupil filter and the polarizer between respective first and second positions between the first and second steps.
31. A method as defined in claim 22, wherein illuminating an object comprises equal intensity illumination of the object in the first and second steps.
32. An imaging method comprising:
generating light for illuminating an object having features aligned in a first direction and features aligned in a second direction;
imaging the illuminated object onto a surface;

in a first step, selecting light corresponding to features of the illuminated object aligned in the first direction and selecting s-polarized light corresponding to the first direction; and

in a second step, selecting light corresponding to features of the illuminated object aligned in the second direction and selecting s-polarized light corresponding to the second direction.

33. An imaging method as defined in claim 32, wherein illuminating an object comprises illuminating a lithography mask.

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34. An imaging method as defined in claim 32, wherein selecting light is performed by a pupil filter having blocking regions and non-blocking regions, wherein selecting s-polarized light is performed by a polarizer, further comprising rotating the pupil filter and the polarizer between respective first and second positions between the first and second steps.

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35. An imaging method as defined in claim 32, wherein illuminating an object comprises equal intensity illumination of the object in the first and second steps.

20 36. An optical lithographic imaging system for projecting onto a surface a mask having features aligned in a first direction and features aligned in a second direction, comprising:

a pupil filter selective in a first position of light corresponding to features of the illuminated mask aligned in the first direction and selective in a second position of light corresponding to features of the illuminated mask aligned in the second direction;

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a polarizer optically coupled to the pupil filter and selective in the first position of s-polarized light corresponding to the first direction and selective in the second position of s-polarized light corresponding to the second direction; and

a device configured for movement of the pupil filter and the polarizer between the respective first and second positions thereof.

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37. An imaging method as defined in claim 36, wherein the device is configured for rotating the pupil filter and the polarizer between respective first and second positions.

38. An imaging method as defined in claim 36, wherein the pupil filter includes one or more blocking regions and one or more non-blocking regions.

39. An imaging method as defined in claim 38, wherein the blocking regions comprise wedge-shaped blocking regions.

40. An imaging method as defined in claim 38, wherein the blocking regions are bounded by an inner radius and an outer radius.

41. An imaging method as defined in claim 38, wherein the pupil filter further includes a region proximate an optical axis with partial transmission of light.

42. An imaging method as defined in claim 36, wherein the polarizer comprises a birefringent half-wave plate.

43. A method of projecting an image onto a surface, comprising:

illuminating an object having features aligned at least in a first direction and in a second direction;

projecting s-polarized light corresponding to features aligned in the first direction onto the surface, while blocking p-polarized light corresponding to features aligned in the first direction and blocking light corresponding to features aligned in the second direction;

and

projecting s-polarized light corresponding to features aligned in the second direction onto the surface, while blocking p-polarized light corresponding to features aligned in the second direction and blocking light corresponding to features aligned in the first direction.

44. An imaging system for imaging an object onto a surface, the object having features aligned at least in a first direction and features aligned in a second direction, comprising:

a lens system;

a pupil filter located proximate a pupil of the lens system, the pupil filter having a first position selective of light corresponding to the features aligned in the first direction, and a second position selective of light corresponding to the features aligned in the second
5 direction; and

a polarizer optically coupled to the pupil filter having a first polarizer position selective of s-polarized light corresponding to the first direction, and a second polarizer position selective of s-polarized light corresponding to the second direction, the pupil filter coordinated with the polarizer to be in the first polarizer position when the pupil filter is in
10 the first position, and in the second polarizer position when the pupil filter is in the second position.